TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

MOBIWIRE MOBILES (NINGBO) CO.,LTD

No.999,Dacheng East Road,Fenghua,Zhejiang,China

FCC ID: 2ADA4OWNF1026

Report Type:	**Product Type:**
Original Report	3G Feature Phone

Test Engineer: Stone Zhang

Report Number: RSHA190626003-00B

Report Date: 2019-07-23

Reviewed By: Oscar Ye
RF Leader

Prepared By: Bay Area Compliance Laboratories Corp. (Kunshan)
No.248 Chenghu Road, Kunshan, Jiangsu province, China
Tel: +86-0512-86175000
Fax: +86-0512-88934268
www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	MOBIWIRE MOBILES (NINGBO) CO.,LTD
Tested Model	F1026
Product Type	3G Feature Phone
Dimension	100.37mm(L)*53.6mm(W)*20.8mm(H)
Power Supply	DC 5V charging by adapter and DC 3.7V from battery

Adapter information:
Model: A31A-050055U-US1
Input: AC 100-240V, 50/60Hz 0.2A
Output: DC 5V, 550mA

**All measurement and test data in this report was gathered from production sample serial number: 20190626003. (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-06-26)*

Objective

This type approval report is prepared on behalf of MOBIWIRE MOBILES (NINGBO) CO.,LTD in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E of the Federal Communication Commission's rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submissions with FCC ID: 2ADA4OWNF1026.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-Part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-D.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

Channel List

Mode	Channel		Frequency
GSM/GPRS 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
PCS/GPRS 1900	Low	512	1850.2
	Middle	661	1880.0
	High	810	1909.8
WCDMA Band II	Low	9262	1852.4
	Middle	9400	1880.0
	High	9538	1907.6
WCDMA Band V	Low	4132	826.4
	Middle	4183	836.6
	High	4233	846.6

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

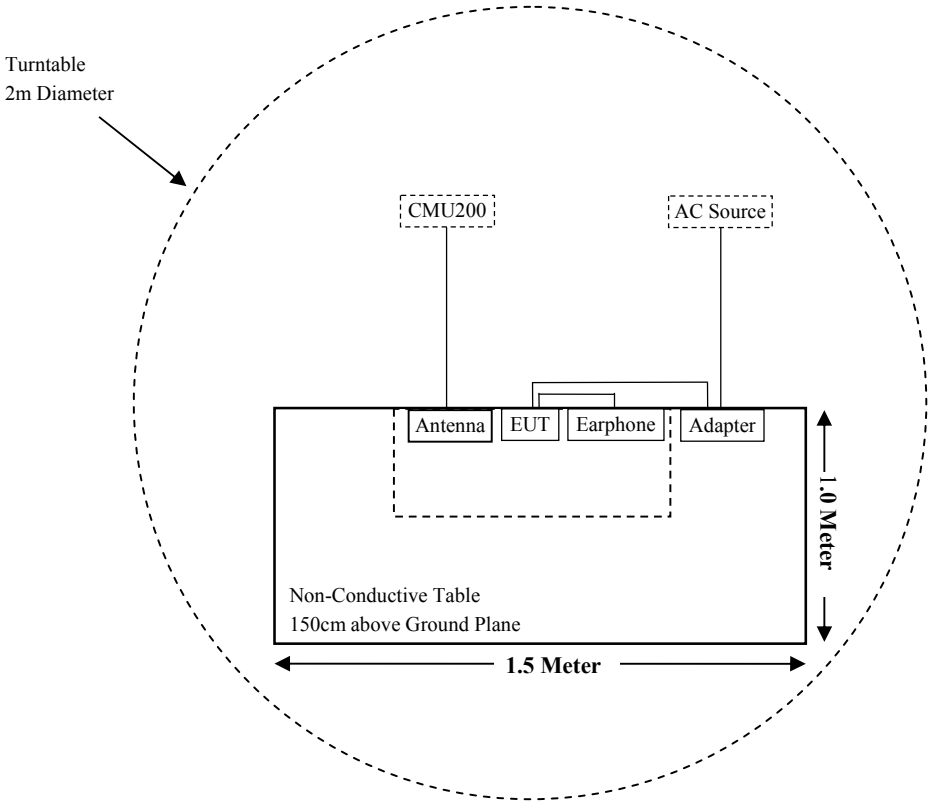
Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605
Aihuaxin technology	Antenna	/	/

External Cable List and Details

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emissions(Below &Above 1GHz)



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §1.1307(b) & §2.1093	RF Exposure Information	Compliant
§2.1046; § 22.913 (a);§ 24.232 (c)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a); § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a)	Spurious Radiated Emissions	Compliant
§ 22.917 (a); § 24.238 (a)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
HP	Signal Generator	HP 8341B	2624A00116	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sunol Sciences	Bilog antenna	JB3	A060217	2017-08-04	2020-08-03
Sonoma Instrunent	Pre-amplifier	310N	171205	2018-08-14	2019-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-7	007	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2018-11-30	2019-11-29
Radiated Emission Test（Chamber 2#）					
HP	Signal Generator	HP 8341B	2624A00116	2018-11-30	2019-11-29
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3115	6229	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	2516	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2018-08-15	2019-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2018-11-30	2019-11-29

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2018-11-30	2019-11-29
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2018-11-30	2019-11-29
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-12-20	2019-12-19
BEST	DC Power Supply	PS-1502D+	DC001	2018-10-10	2019-10-09
MOBIWIRE	RF Cable	MOBIWIRE 01	C01	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1307,§2.1093.

Test Result

Compliant, please refer to the SAR report: RSHA190626003-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

§2.1046; § 22.913 (a); § 24.232 (c) - RF OUTPUT POWER

Applicable Standards

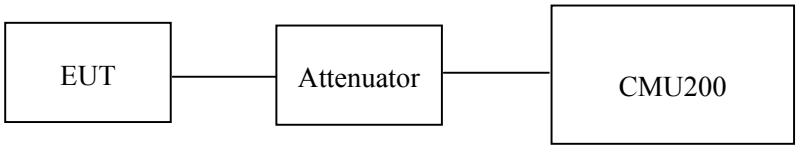
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts(33dBm) EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications..

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMU200 through sufficient attenuation.



Radiated Output Power:
The measurements procedures specified in ANSI/TIA-603-D were applied.
a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used,raise and lower the test antenna to obtain a maximum reading.
LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)
e) Determine the effective radiated output power at each angular position from
the readings in steps b) and d) using the following equation:
ERP (dBm) = LVL (dBm) + LOSS (dB)
f) The maximum ERP is the maximum value determined in the preceding step.
(Note: Effective Isotropic Radiated Power (EIRP) can be computed using the following:
EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

Test Data

Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	50%
ATM Pressure:	101.2kPa

The testing was performed by Stone Zhang on 2019-07-20.

Conducted Power:

GSM 850 Band

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.10	38.45
	190	836.6	32.10	38.45
	251	848.8	32.10	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.14	31.59	30.23	26.48	38.45
	190	836.6	32.10	31.59	30.17	26.32	38.45
	251	848.8	32.13	31.65	30.21	26.30	38.45

WCDMA Band V

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	ARM	1	22.06	21.90	22.02
		RMC12.2Kbps	1	22.45	22.44	21.90
		HSDPA	1	22.45	22.32	21.70
			2	22.21	22.12	21.53
			3	22.37	22.21	21.87
			4	22.35	22.33	21.74
		HSUPA	1	22.38	22.30	21.73
			2	22.05	22.09	21.62
			3	22.24	22.26	21.64
			4	22.25	22.40	21.60
			5	22.39	22.06	21.65
		HSPA+	1	22.38	22.39	21.54

PCS 1900 Band

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	30.20	33
	661	1880.0	30.20	33
	810	1909.8	30.20	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	30.15	29.24	27.26	23.85	33
	661	1880.0	30.14	29.31	27.37	23.93	33
	810	1909.8	30.16	29.41	27.50	24.15	33

WCDMA Band II

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	ARM	1	20.49	20.43	20.35
		RMC12.2Kbps	1	20.17	20.18	20.63
		HSDPA	1	20.85	20.15	20.63
			2	20.44	20.78	20.43
			3	20.25	20.08	20.16
			4	20.99	20.36	20.56
		HSUPA	1	20.03	20.62	20.17
			2	20.82	20.26	20.33
			3	20.25	20.41	20.34
			4	20.75	20.42	20.52
			5	20.30	20.21	20.26
		HSPA+	1	20.12	20.90	20.46

Peak-to-average ratio (PAR):

PCS 1900 Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	2.45	13
	Middle	2.37	13
	High	2.16	13

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	2.52	13
	Middle	2.46	13
	High	2.39	13

WCDMA Band II

Mode	Channel	PAR (dB)	Limit (dB)
ARM	Low	2.85	13
	Middle	2.68	13
	High	2.54	13
HSDPA	Low	2.49	13
	Middle	2.35	13
	High	2.26	13
HSUPA	Low	2.59	13
	Middle	2.44	13
	High	2.31	13
HSPA+	Low	2.83	13
	Middle	2.67	13
	High	2.43	13

Radiated Power:

GSM Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
GSM 850 Band, Middle Channel (ERP)										
836.6	96.13	348	309	H	31.27	0.63	-1.14	29.50	38.45	8.95
836.6	91.05	129	256	V	23.52	0.63	-1.14	21.75	38.45	16.70
GPRS 850 Band, Middle Channel (ERP)										
836.6	96.56	57	100	H	31.70	0.63	-1.14	29.93	38.45	8.52
836.6	92.97	33	181	V	25.44	0.63	-1.14	23.67	38.45	14.78
PCS 1900 Band, Middle Channel (EIRP)										
1880.0	88.67	360	165	H	18.54	0.85	8.81	26.50	33	6.50
1880.0	90.26	350	250	V	19.70	0.85	8.81	27.66	33	5.34
GPRS 1900 Band, Middle Channel (EIRP)										
1880.0	87.29	278	136	H	17.16	0.85	8.81	25.12	33	7.88
1880.0	89.37	290	279	V	18.81	0.85	8.81	26.77	33	6.23

WCDMA Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Band V, Middle Channel(ERP)										
836.6	87.64	257	114	H	22.78	0.63	-1.14	21.01	38.45	17.44
836.6	82.66	193	395	V	15.13	0.63	-1.14	13.36	38.45	25.09
WCDMA Band II, Middle Channel(EIRP)										
1880.0	85.37	289	137	H	15.24	0.85	8.81	23.20	33	5.80
1880.0	80.19	120	343	V	9.63	0.85	8.81	17.59	33	15.41

Note:
All above data were tested with no amplifier.
Absolute Level = Submitted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

FCC §2.1049, §22.917, §22.905, §24.238 - OCCUPIED BANDWIDTH

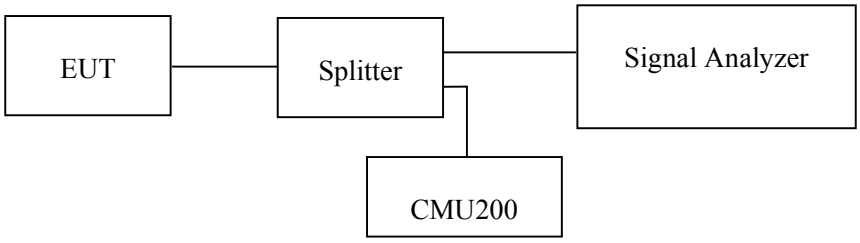
Applicable Standards

FCC 47 §2.1049, §22.917, §22.905, §24.238

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	50%
ATM Pressure:	101.0kPa

The testing was performed by Stone Zhang on 2019-07-13.

EUT operation mode: Transmitting

Test Result: Compliant.

GSM 850 Band

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GSM (GMSK)	836.6	0.317	0.242
GPRS (GMSK)	836.6	0.315	0.246

WCDMA Band V

Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (ARM)	836.6	4.729	4.188
WCDMA (HSDPA)	836.6	4.709	4.168
WCDMA (HSUPA)	836.6	4.729	4.188
WCDMA (HSPA+)	836.6	4.709	4.188

PCS 1900 Band

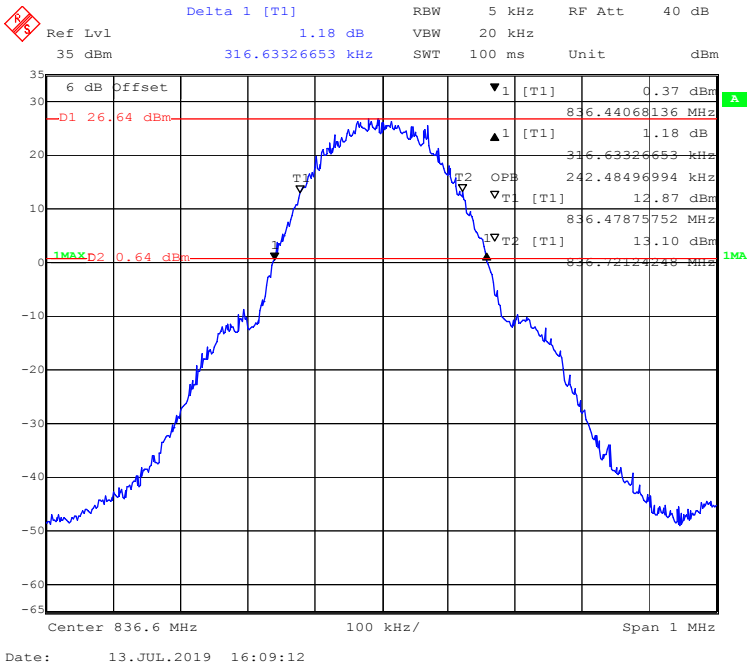
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
GSM (GMSK)	1880.0	0.317	0.244
GPRS (GMSK)	1880.0	0.323	0.246

WCDMA Band II

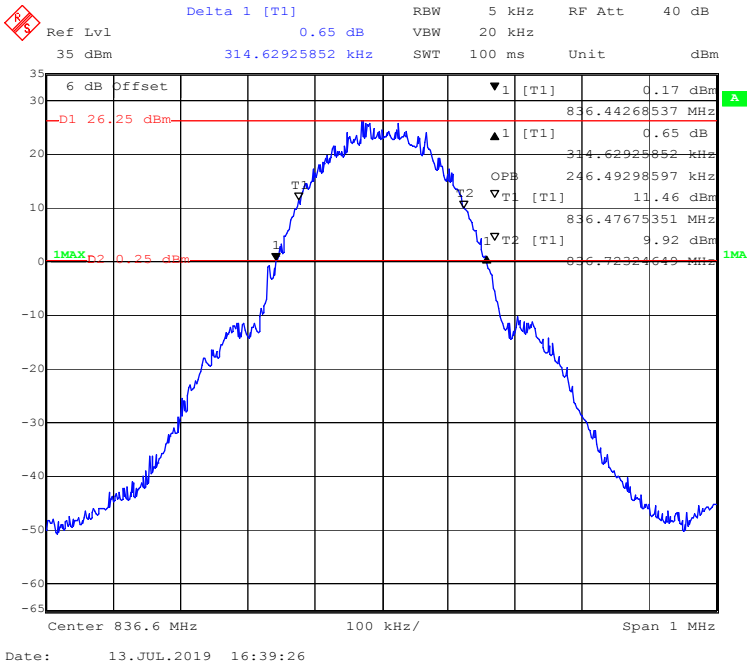
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (ARM)	1880.0	4.729	4.188
WCDMA (HSDPA)	1880.0	4.709	4.188
WCDMA (HSUPA)	1880.0	4.689	4.168
WCDMA (HSPA+)	1880.0	4.689	4.168

GSM 850 Band

99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode

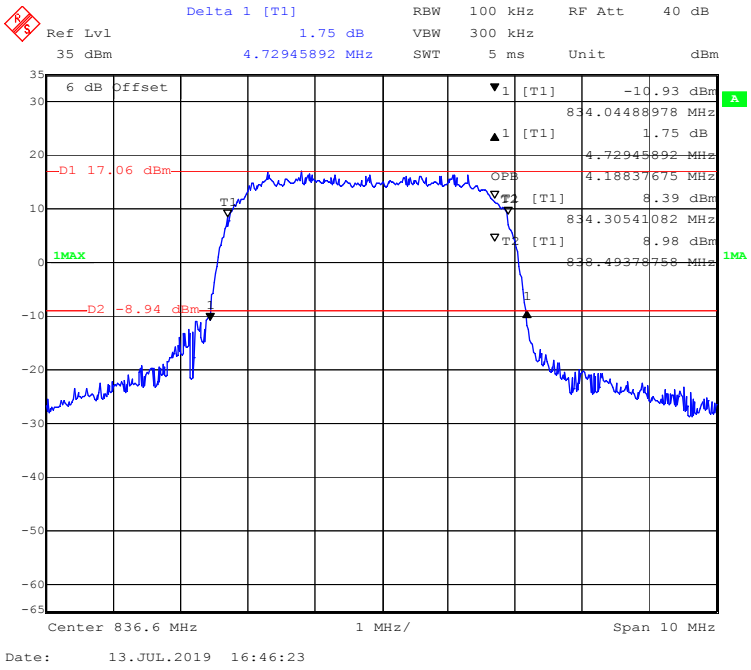


99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode

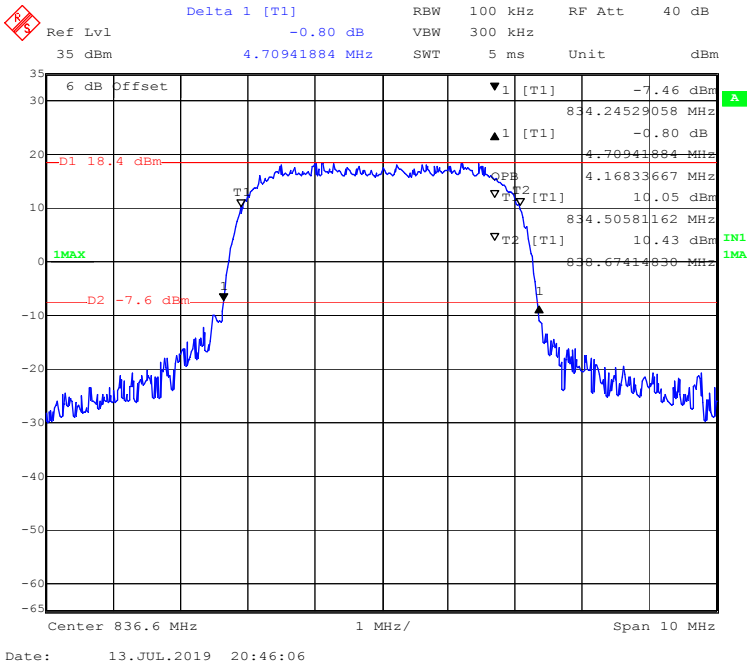


WCDMA Band V

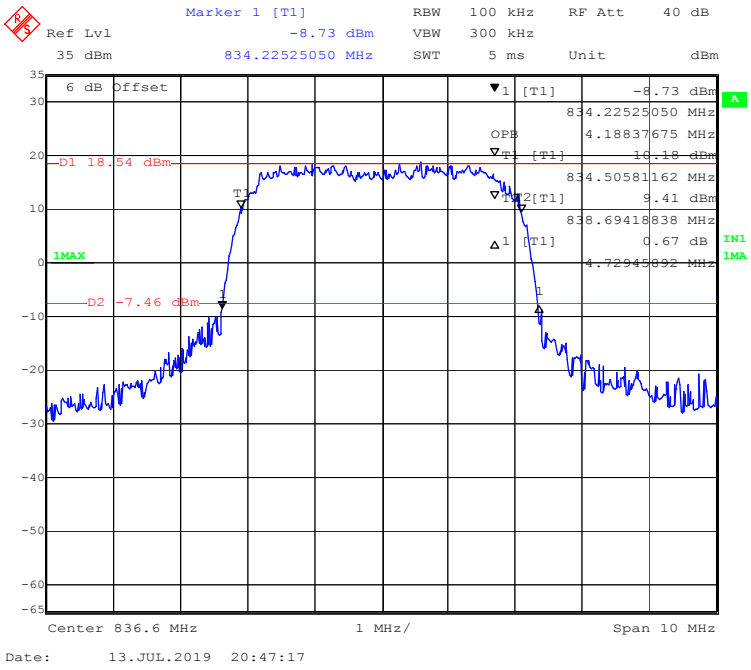
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (ARM) Mode



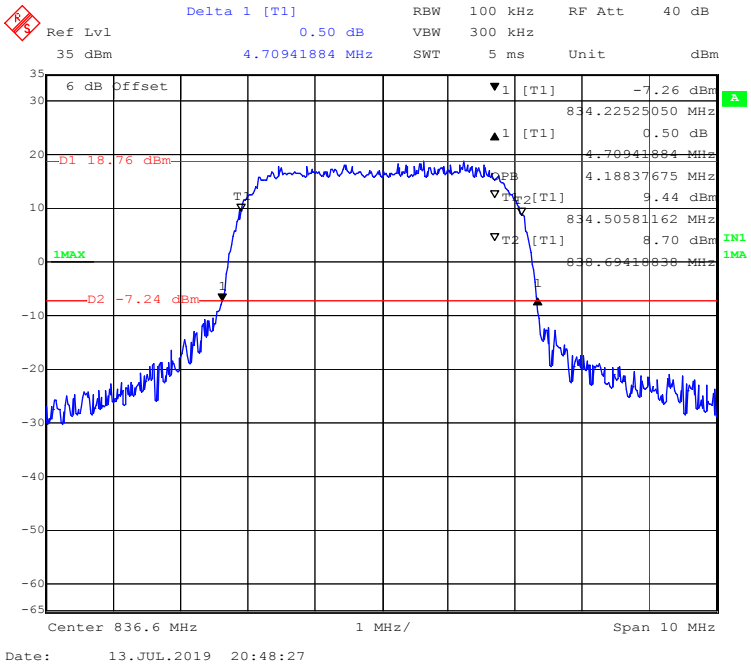
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSDPA) Mode



99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode

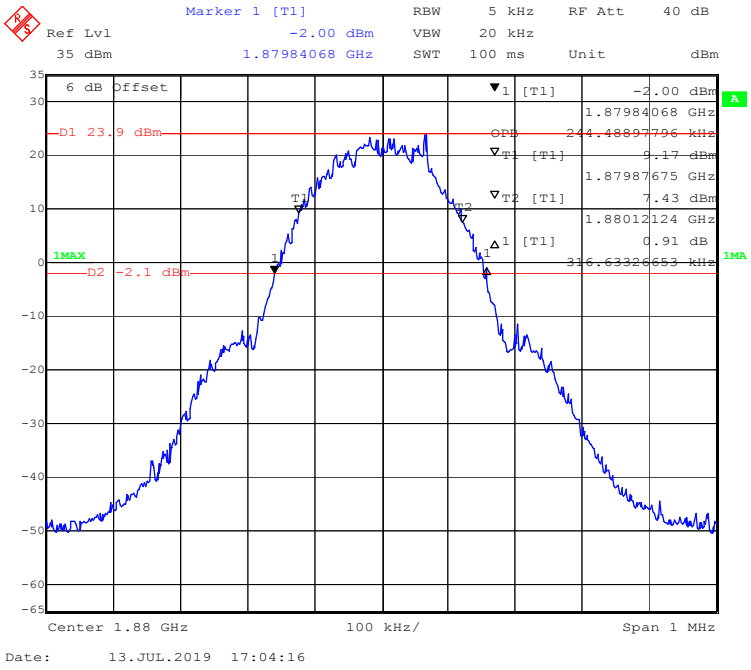


99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSPA+) Mode

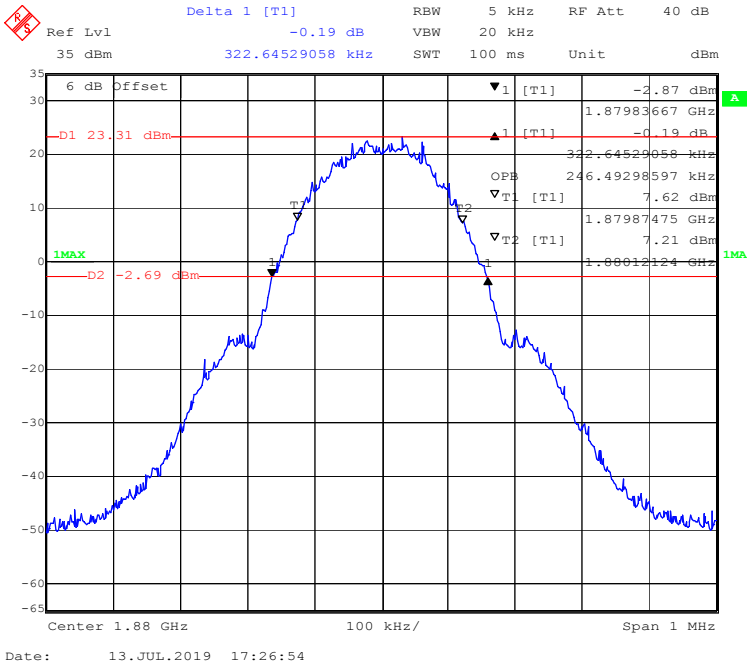


PCS 1900 Band

99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode

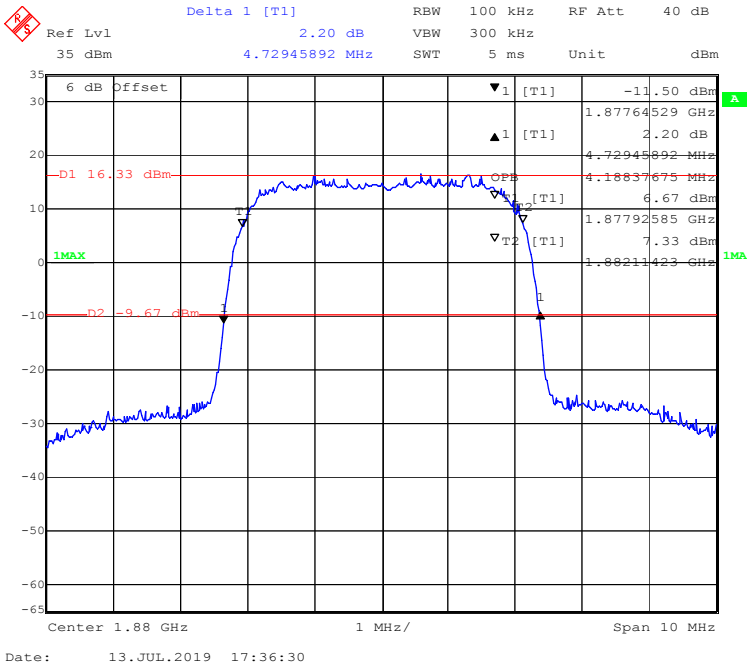


99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode

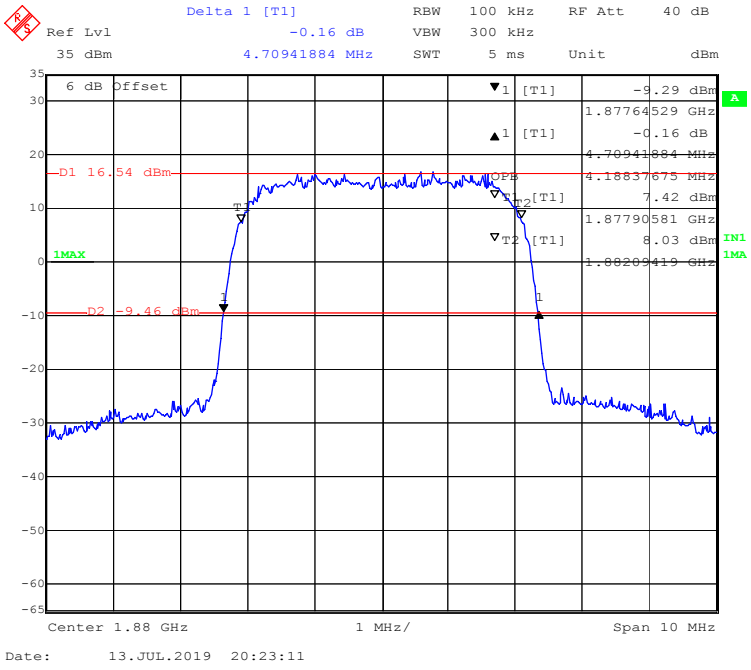


WCDMA Band II

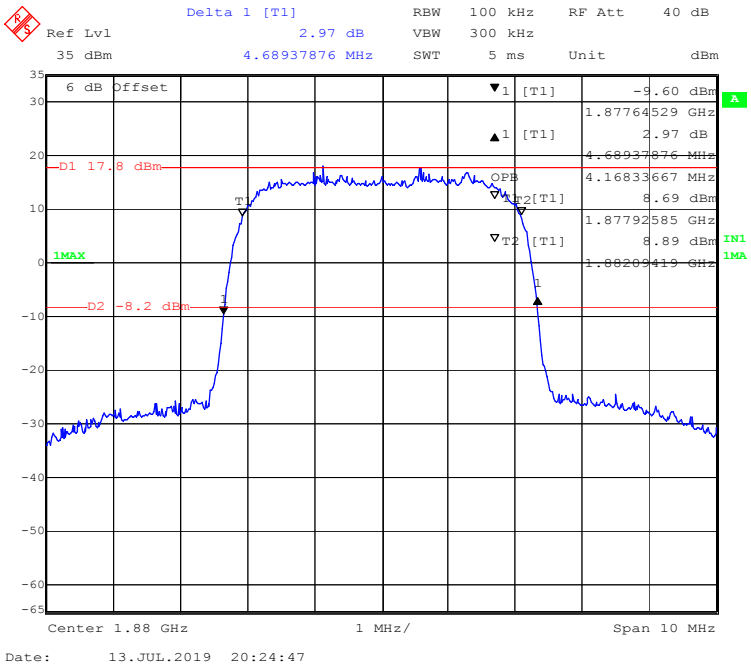
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (ARM) Mode



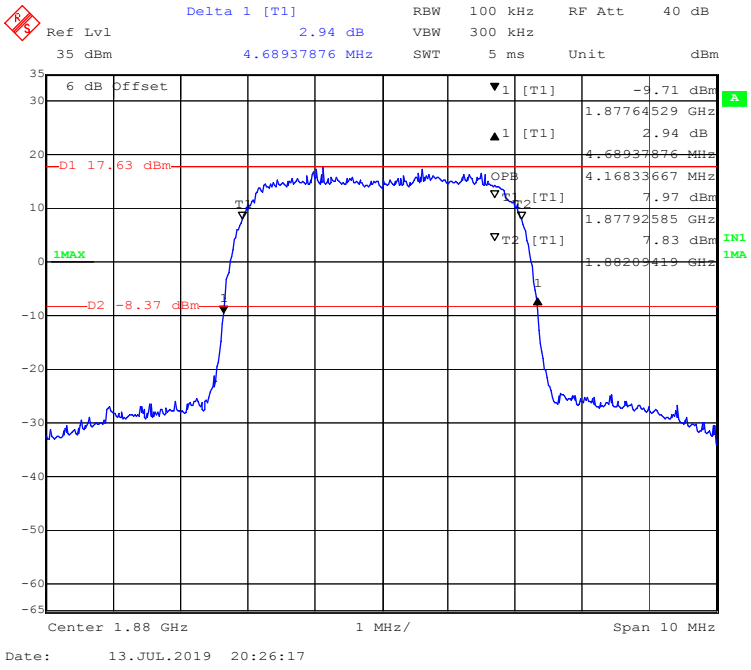
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSDPA) Mode



99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode



99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSPA+) Mode



§ 2.1051; § 22.917 (a); § 24.238 (a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

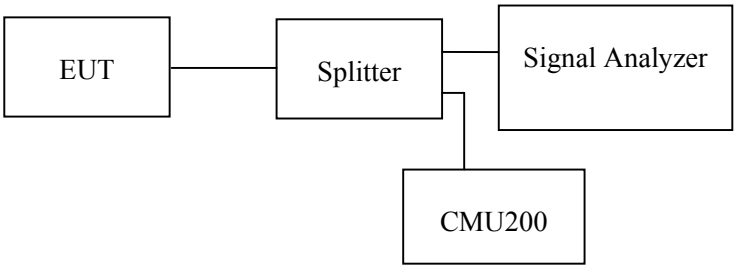
Applicable Standards

FCC §2.1051, §22.917(a), § 24.238 (a)

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz & 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

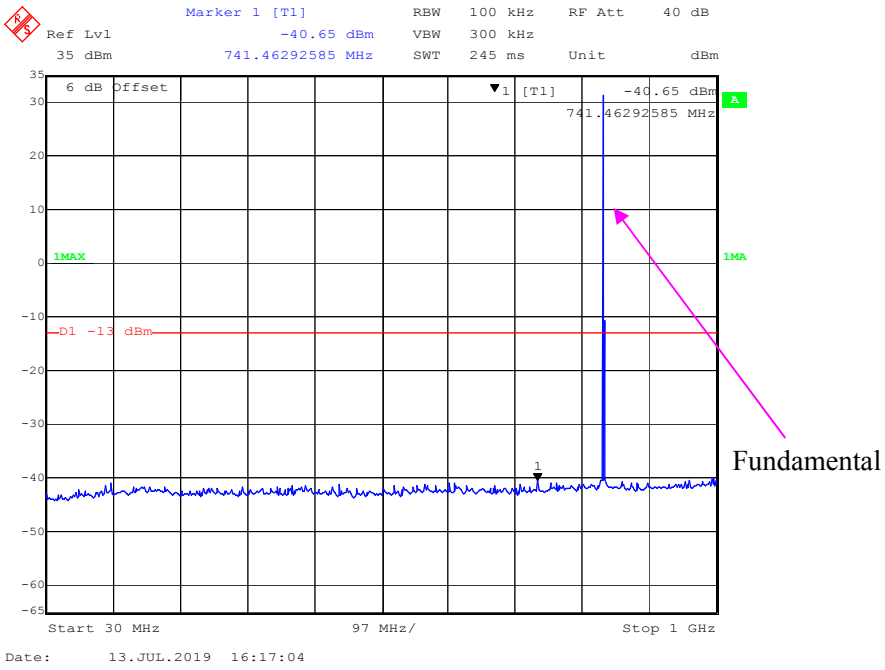
Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	50%
ATM Pressure:	101.2kPa

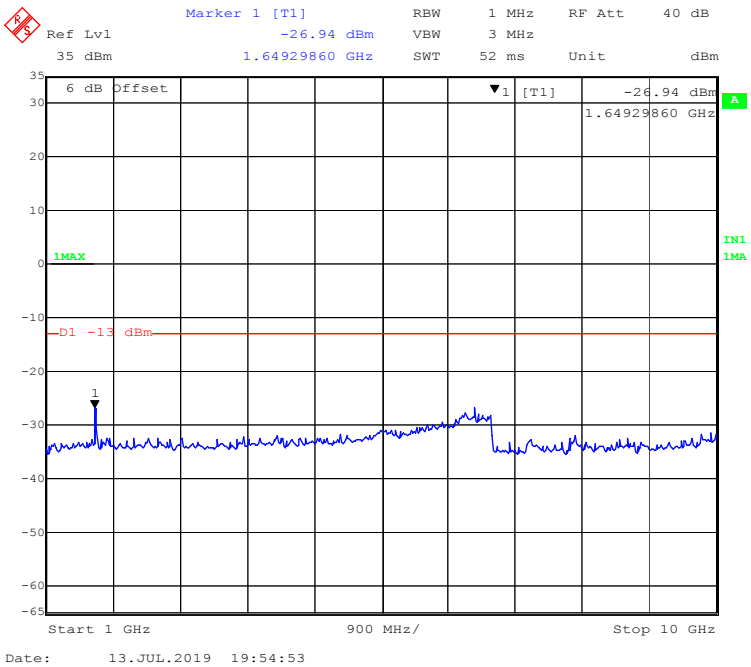
The testing was performed by Stone Zhang on 2019-07-13.

GSM 850 Band:

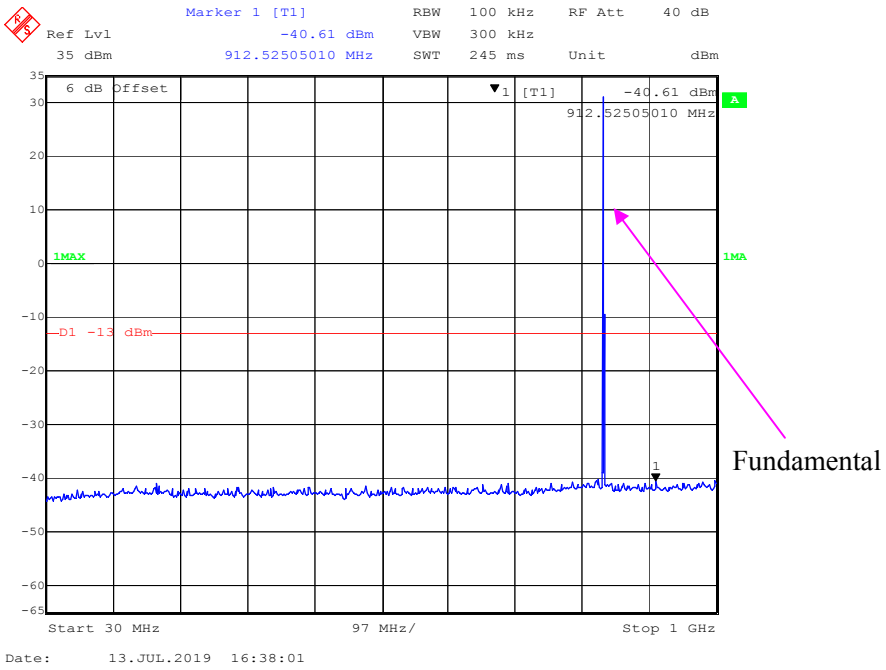
30 MHz – 1 GHz(GSM Mode)



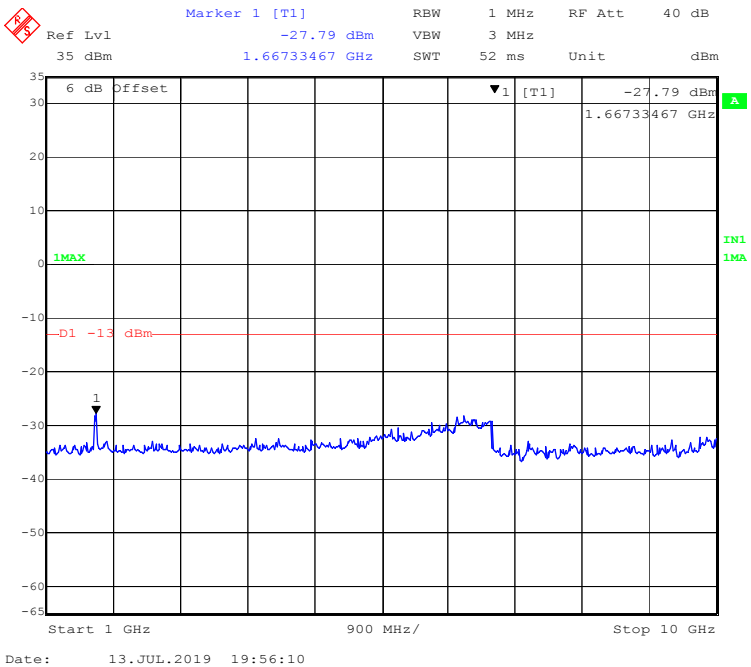
1 GHz – 10 GHz (GSM Mode)



30 MHz – 1 GHz(GPRS Mode)

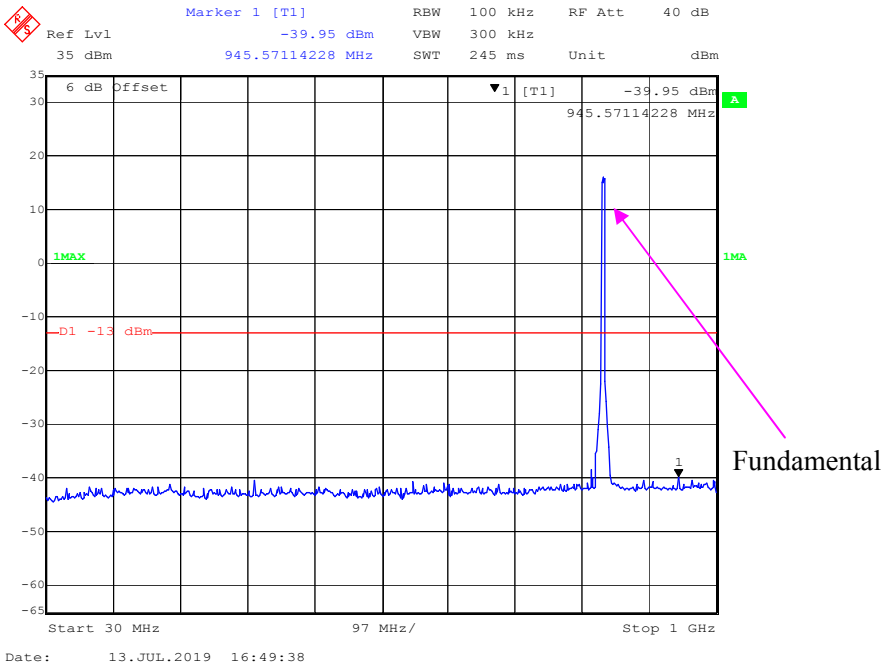


1 GHz – 10 GHz (GPRS Mode)

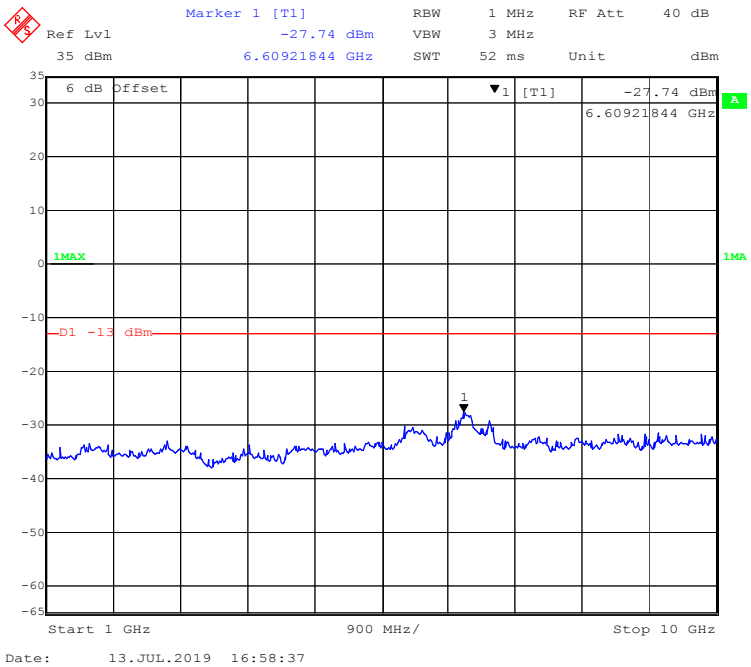


WCDMA Band V:

30 MHz – 1GHz(WCDMA Mode)

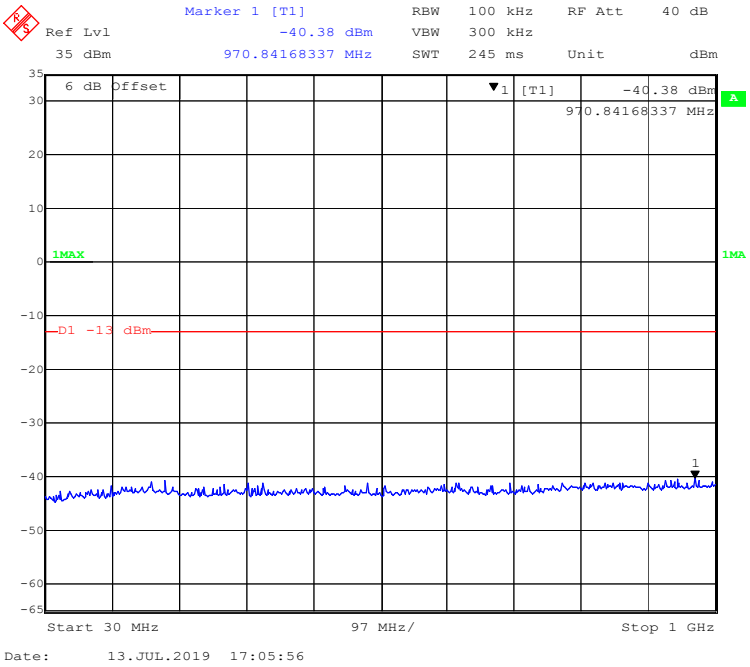


1 GHz – 10 GHz (WCDMA Mode)

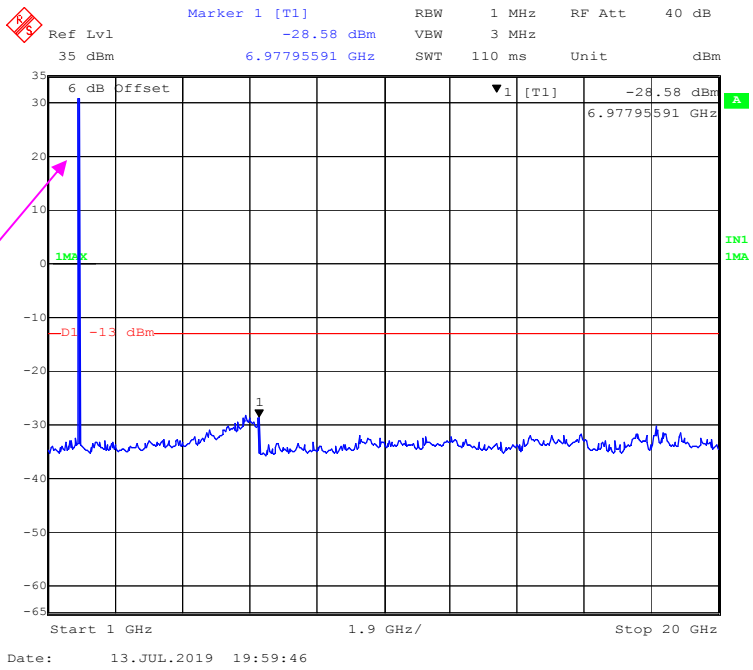


PCS 1900 Band:

30 MHz – 1 GHz(GSM Mode)

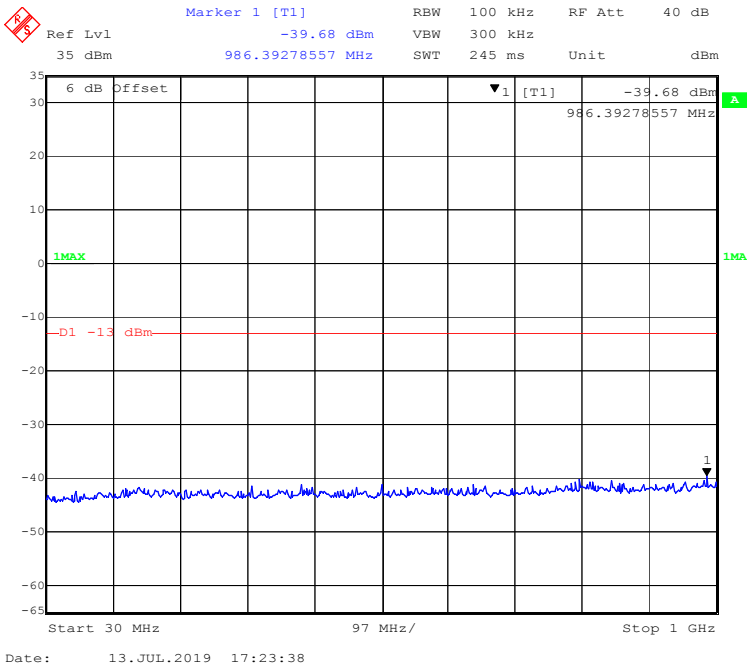


1 GHz – 20 GHz (GSM Mode)

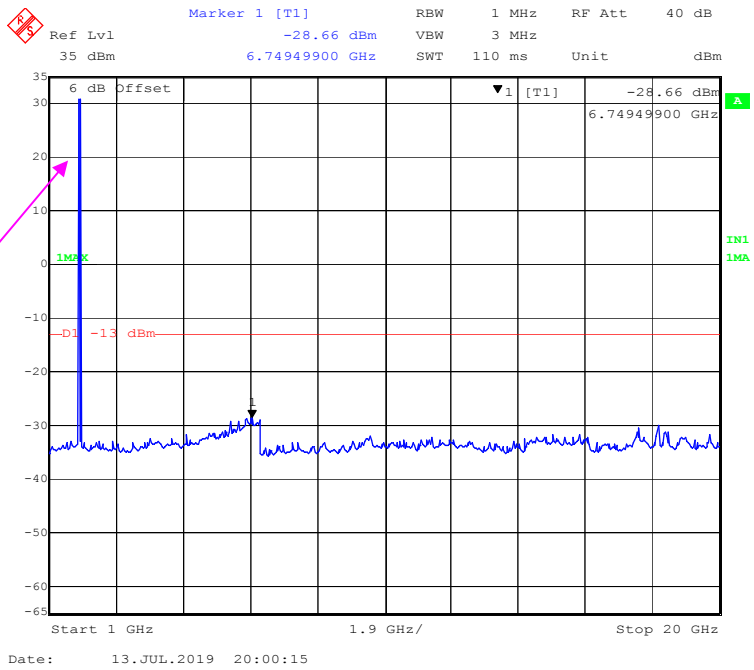


Fundamental

30 MHz – 1 GHz(GPRS Mode)



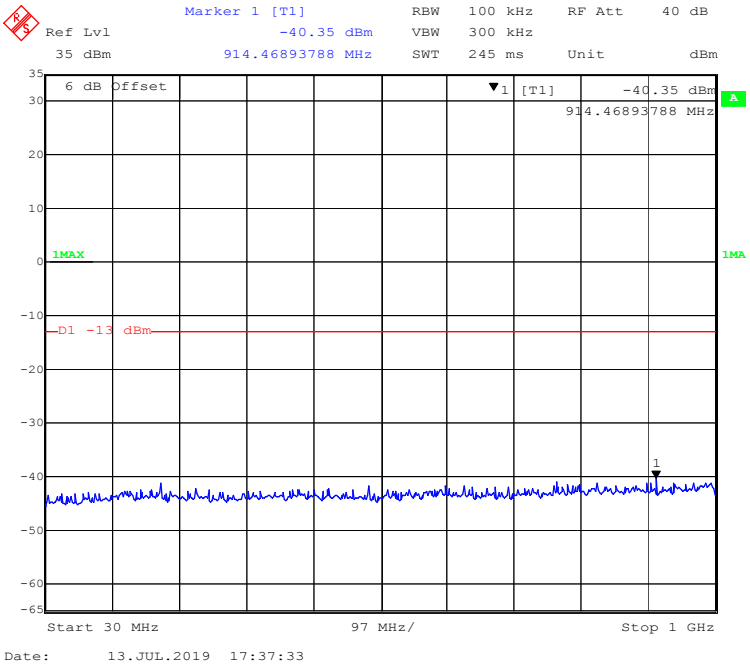
1 GHz – 20 GHz (GPRS Mode)



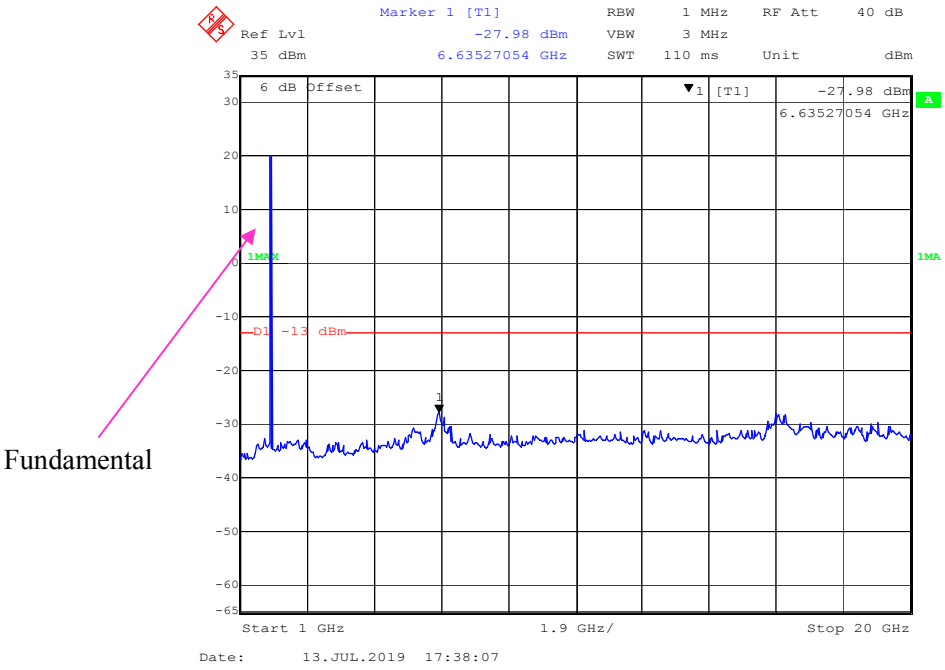
Fundamental

WCDMA Band II:

30 MHz – 1 GHz (WCDMA Mode)



1 GHz – 20 GHz (WCDMA Mode)



FCC § 2.1053; § 22.917 (a); § 24.238 (a) - SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC § 2.1053, §22.917(a), § 24.238 (a)

22.917 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TX pwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	50%
ATM Pressure:	101.2kPa

The testing was performed by Stone Zhang on 2019-07-13.

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data as below)

30 MHz ~ 10 GHz:

GSM 850 Band

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Middle channel										
200.00	42.31	256	212	H	-63.32	0.42	-3.95	-67.69	-13	54.69
200.00	40.08	148	175	V	-65.01	0.42	-3.95	-69.38	-13	56.38
1673.20	60.43	108	144	H	-42.96	0.84	8.48	-35.32	-13	22.32
1673.20	57.68	207	132	V	-46.21	0.84	8.48	-38.57	-13	25.57
2509.80	55.62	356	331	H	-45.32	0.89	10.09	-36.12	-13	23.12
2509.80	52.19	244	121	V	-48.75	0.89	10.09	-39.55	-13	26.55

WCDMA Band V

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
200.00	40.02	63	139	H	-65.61	0.42	-3.95	-69.98	-13	56.98
200.00	37.92	43	341	V	-67.17	0.42	-3.95	-71.54	-13	58.54
1673.20	52.84	174	228	H	-50.55	0.84	8.48	-42.91	-13	29.91
1673.20	49.83	285	300	V	-54.06	0.84	8.48	-46.42	-13	33.42
2509.80	49.15	16	247	H	-51.79	0.89	10.09	-42.59	-13	29.59
2509.80	47.09	152	294	V	-53.85	0.89	10.09	-44.65	-13	31.65

30 MHz ~ 20 GHz:

PCS 1900 Band

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Middle channel										
200.00	40.57	93	366	H	-65.06	0.42	-3.95	-69.43	-13	56.43
200.00	37.38	314	301	V	-67.71	0.42	-3.95	-72.08	-13	59.08
3760.00	40.68	345	240	H	-66.10	0.95	9.74	-57.31	-13	44.31
3760.00	37.29	185	271	V	-69.81	0.95	9.74	-61.02	-13	48.02
5640.00	39.68	69	147	H	-63.49	1.15	10.74	-53.90	-13	40.90
5640.00	36.43	136	352	V	-67.04	1.15	10.74	-57.45	-13	44.45

WCDMA Band II

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
200.00	41.91	272	115	H	-63.72	0.42	-3.95	-68.09	-13	55.09
200.00	38.56	259	357	V	-66.53	0.42	-3.95	-70.90	-13	57.90
3760.00	43.75	189	238	H	-63.03	0.95	9.74	-54.24	-13	41.24
3760.00	40.06	154	300	V	-67.04	0.95	9.74	-58.25	-13	45.25
5640.00	41.37	143	266	H	-61.80	1.15	10.74	-52.21	-13	39.21
5640.00	37.43	199	331	V	-66.04	1.15	10.74	-56.45	-13	43.45

Note:
1) Absolute Level = Submitted Level - Cable loss + Antenna Gain
2) Margin = Limit- Absolute Level

FCC § 22.917 (a); § 24.238 (a) - BAND EDGES

Applicable Standards

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

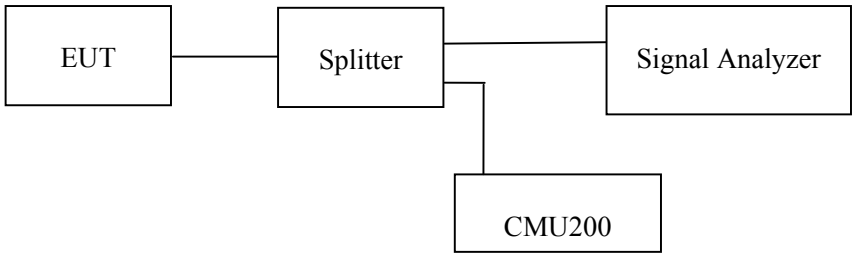
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	50%
ATM Pressure:	101.2kPa

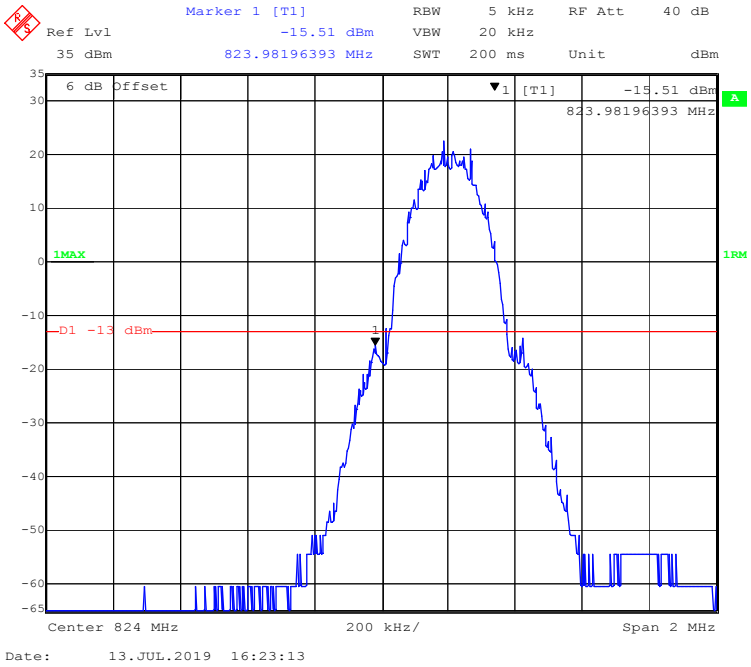
The testing was performed by Stone Zhang on 2019-07-13.

EUT operation mode: Transmitting

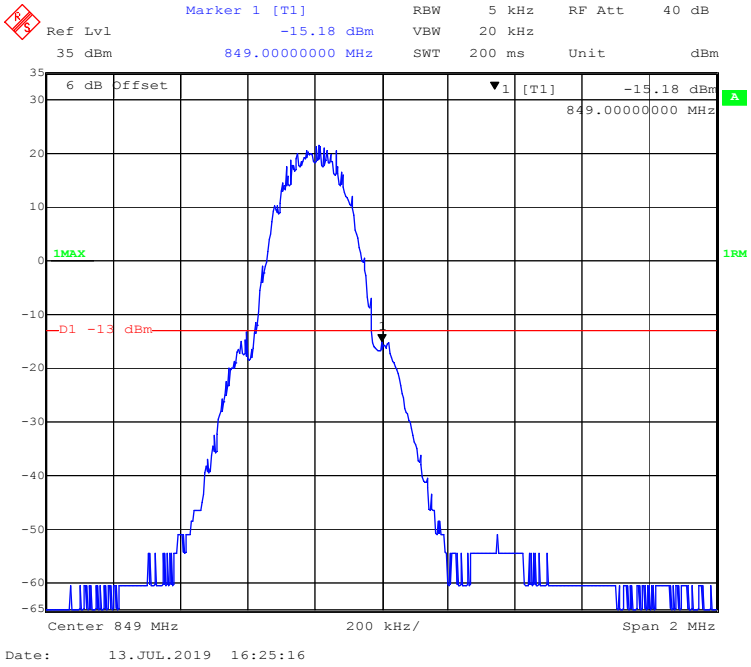
Test Result: Compliant.

GSM 850 Band:

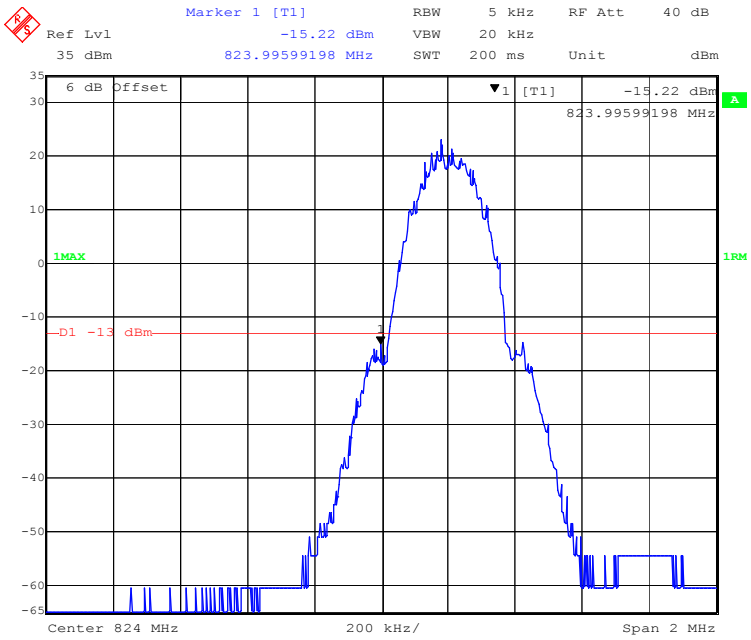
GSM Mode, Left Band Edge



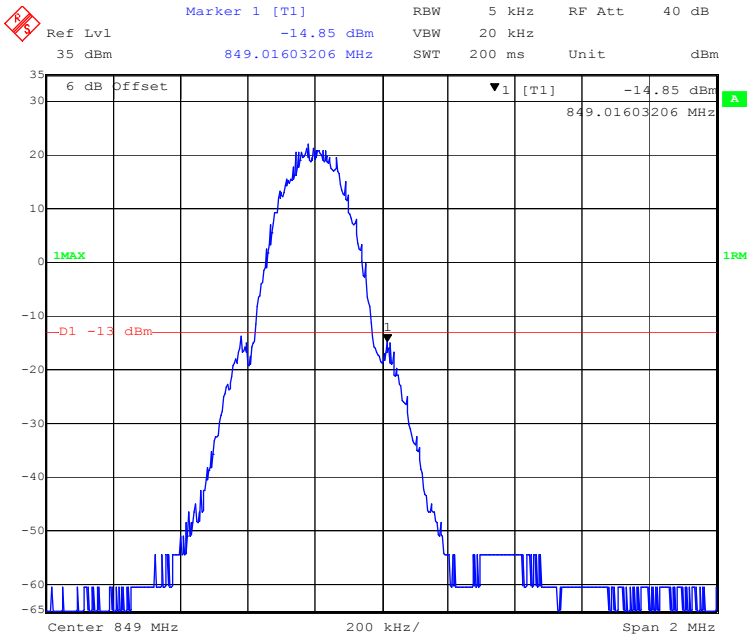
GSM Mode, Right Band Edge



GPRS Mode, Left Band Edge

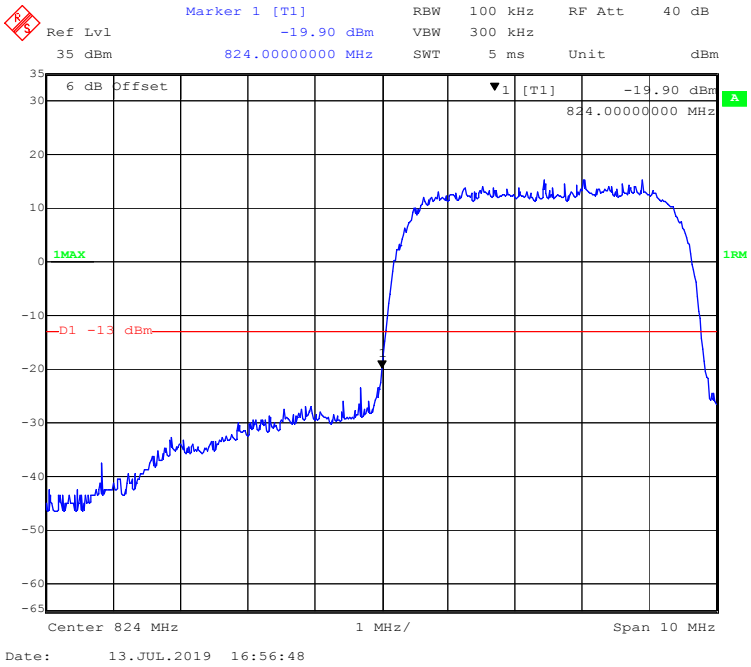


GPRS Mode, Right Band Edge

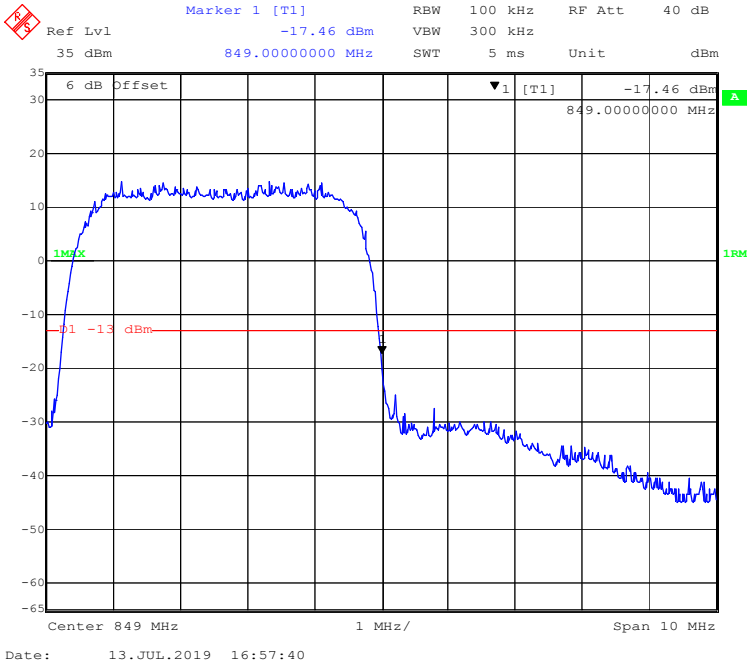


WCDMA Band V:

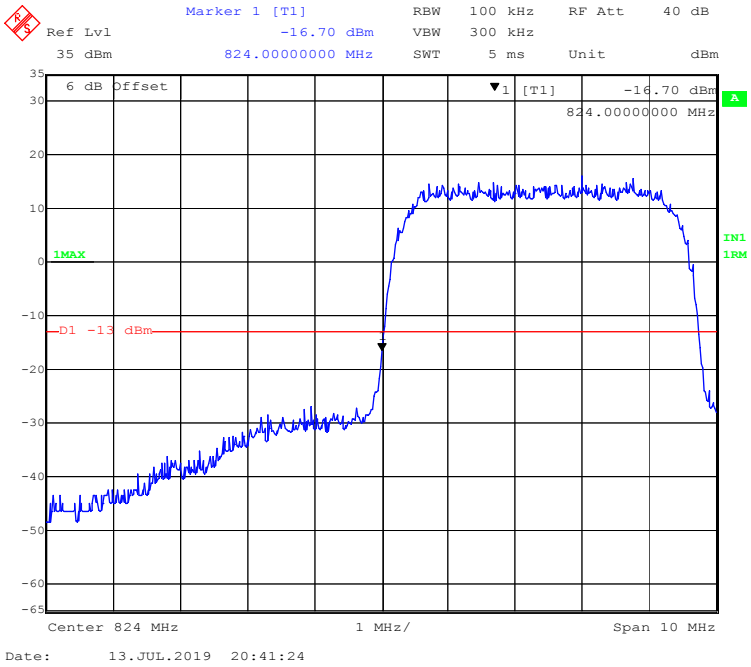
ARM Mode, Left Band Edge



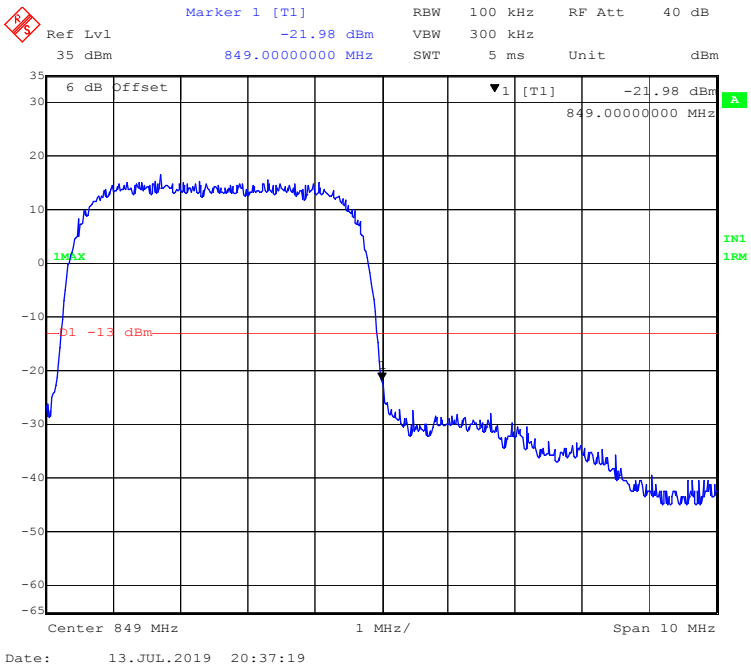
ARM Mode, Right Band Edge



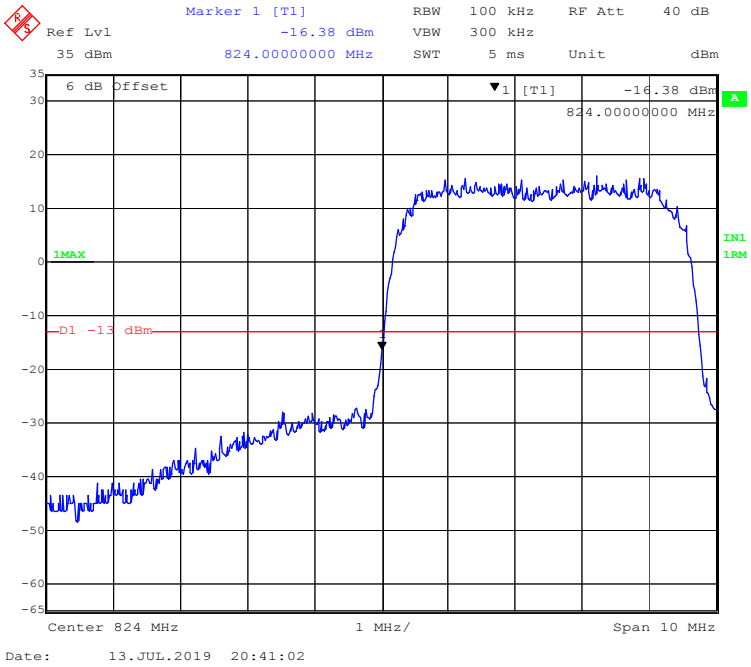
HSDPA Mode, Left Band Edge



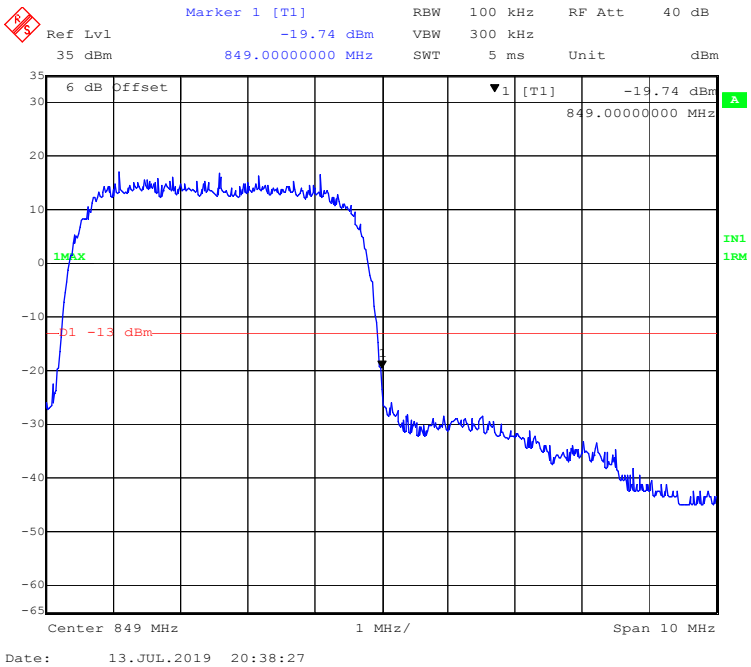
HSDPA Mode, Right Band Edge



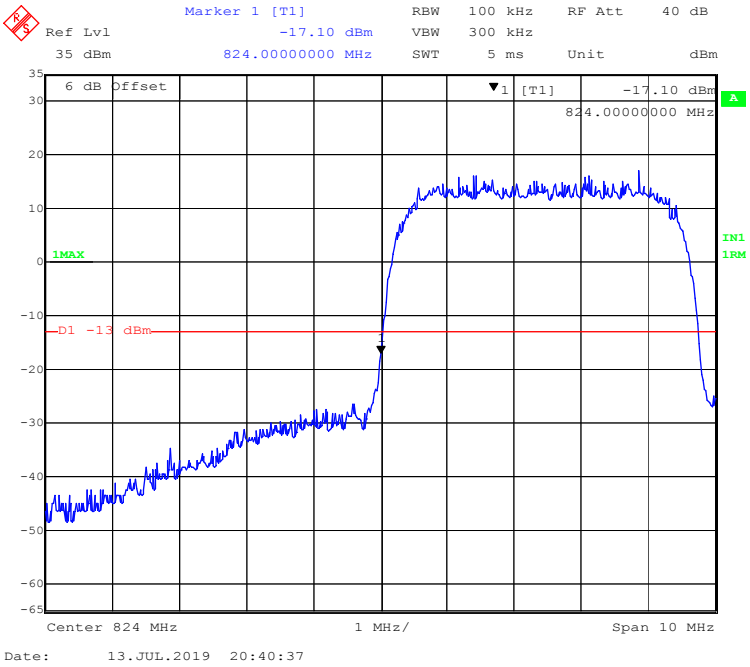
HSUPA Mode, Left Band Edge



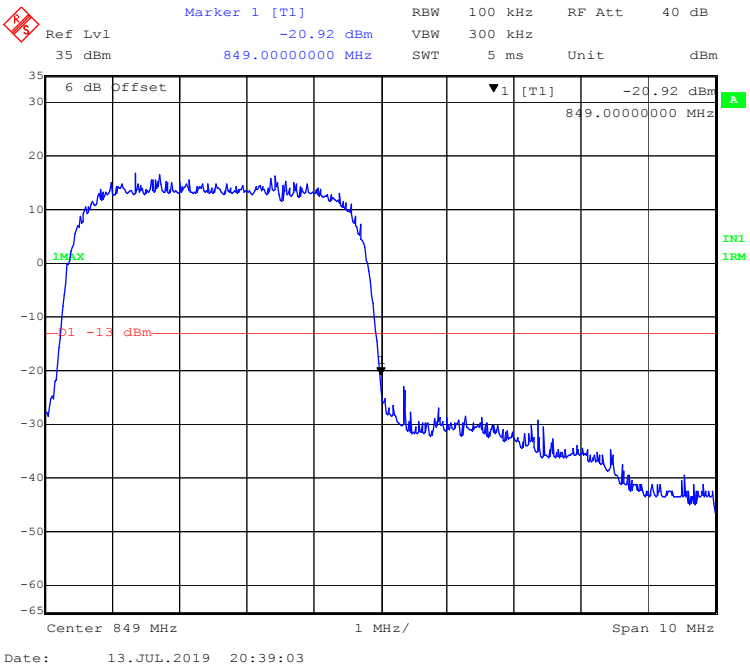
HSUPA Mode, Right Band Edge



HSPA+ Mode, Left Band Edge

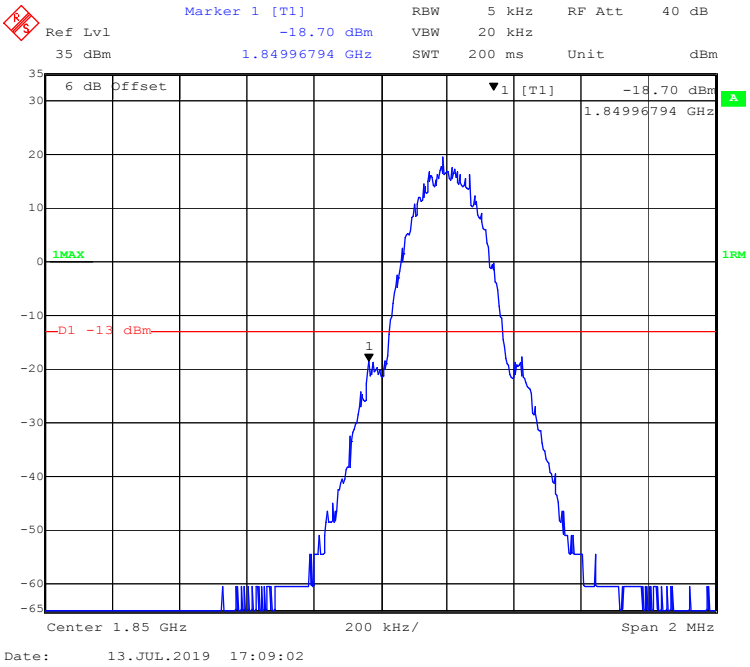


HSPA+ Mode, Right Band Edge

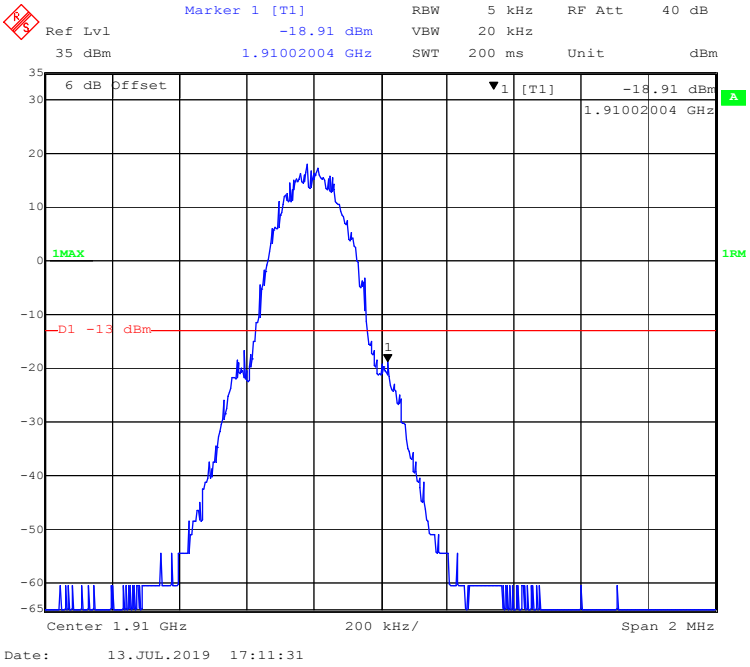


PCS 1900 Band:

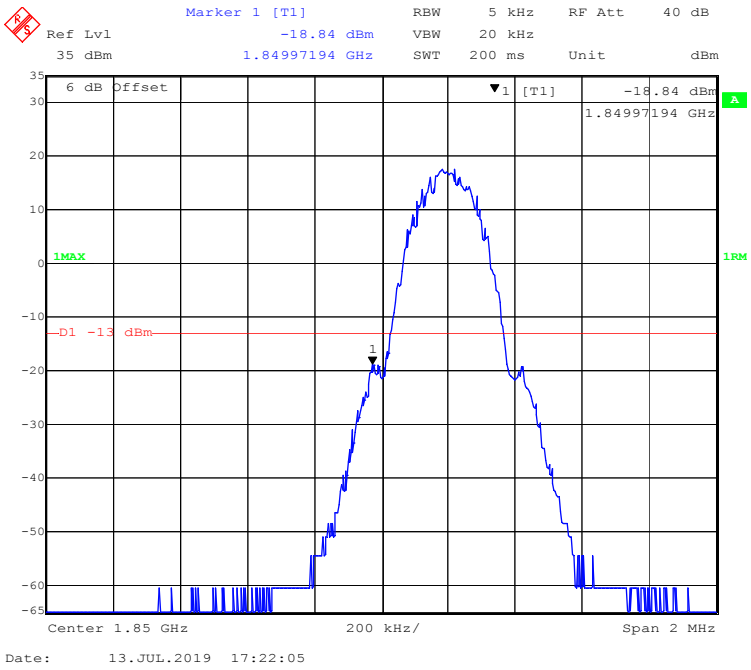
GSM Mode, Left Band Edge



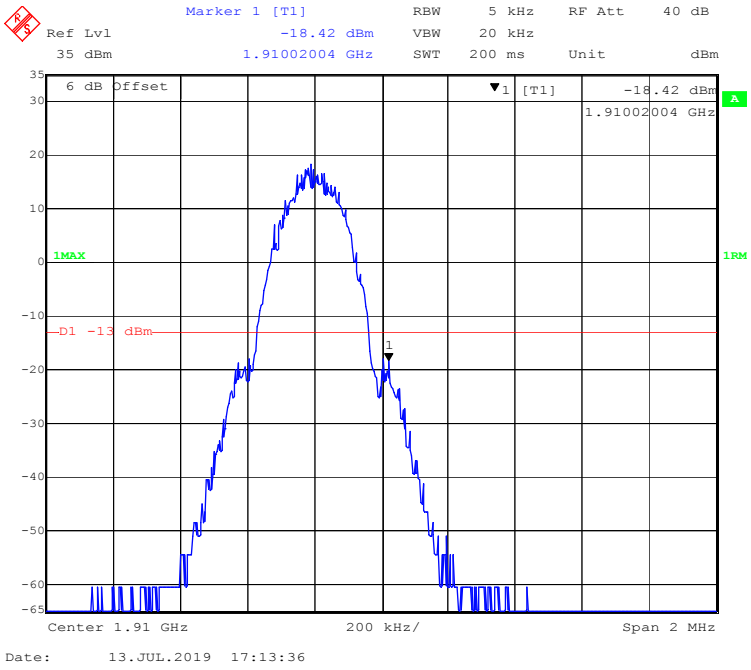
GSM Mode, Right Band Edge



GPRS Mode, Left Band Edge

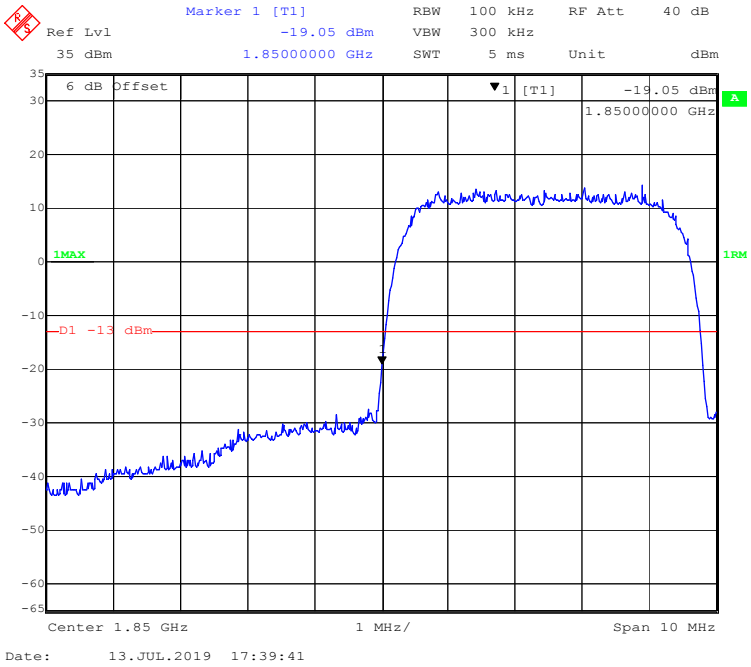


GPRS Mode, Right Band Edge

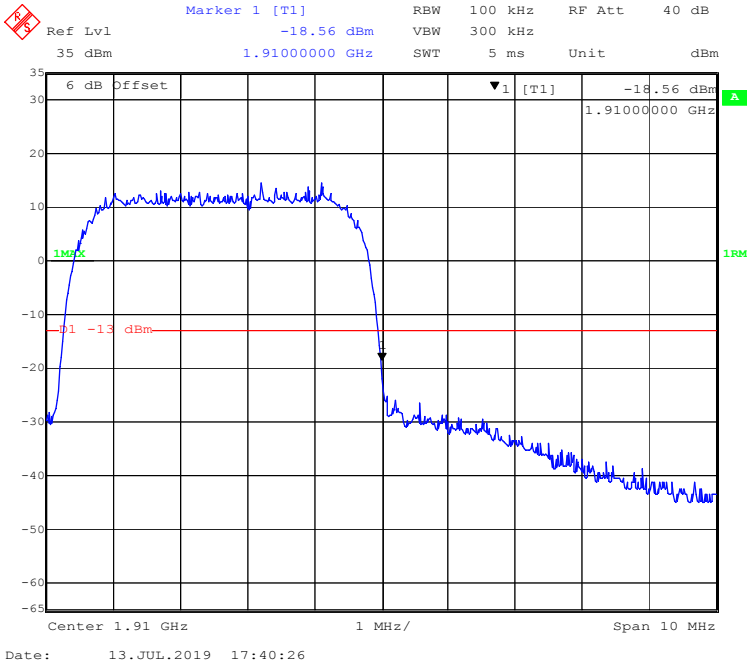


WCDMA Band II

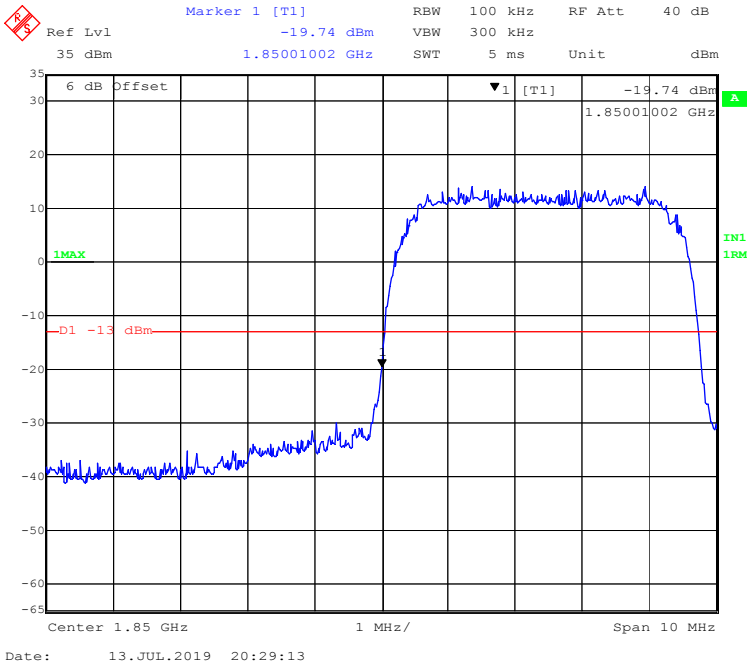
ARM Mode, Left Band Edge



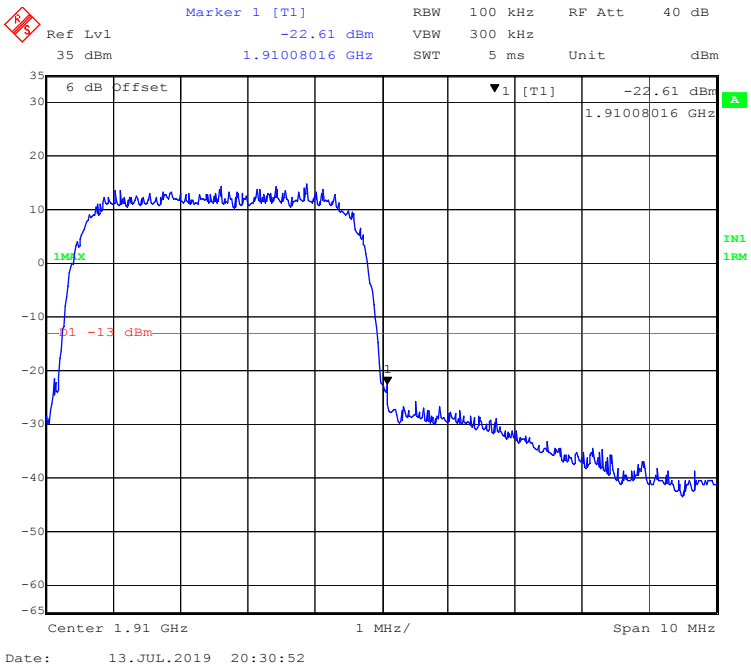
ARM Mode, Right Band Edge



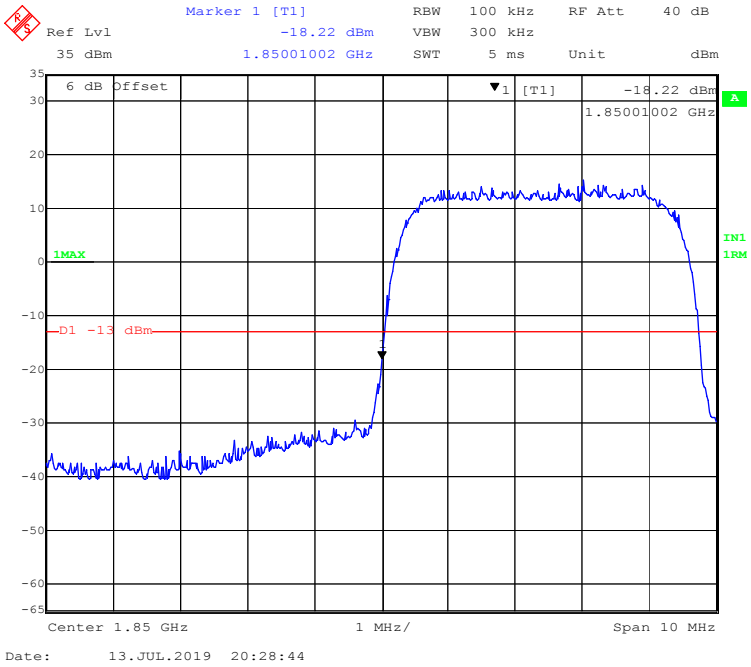
HSDPA Mode, Left Band Edge



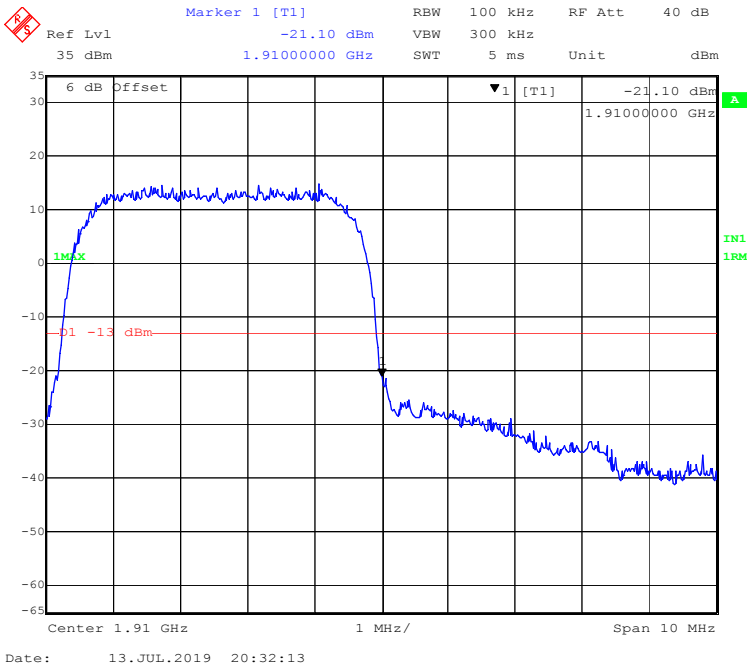
HSDPA Mode, Right Band Edge



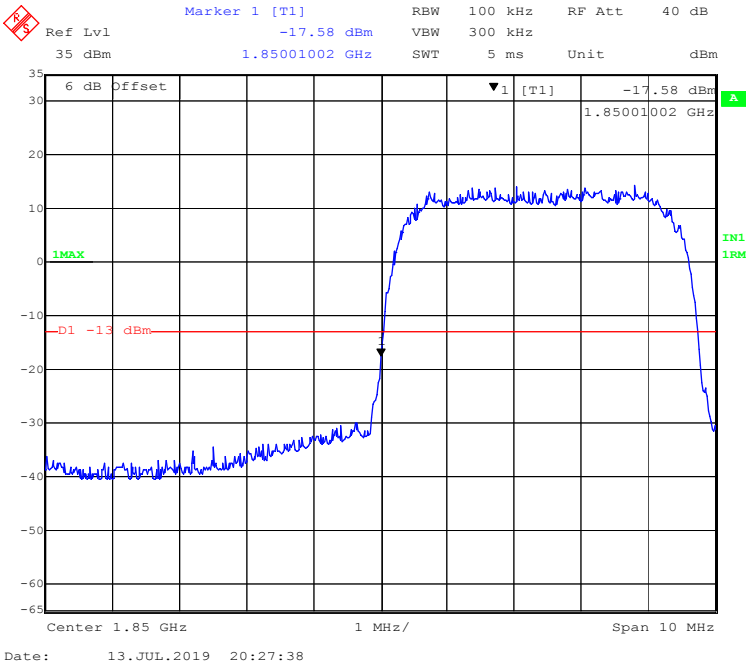
HSUPA Mode, Left Band Edge



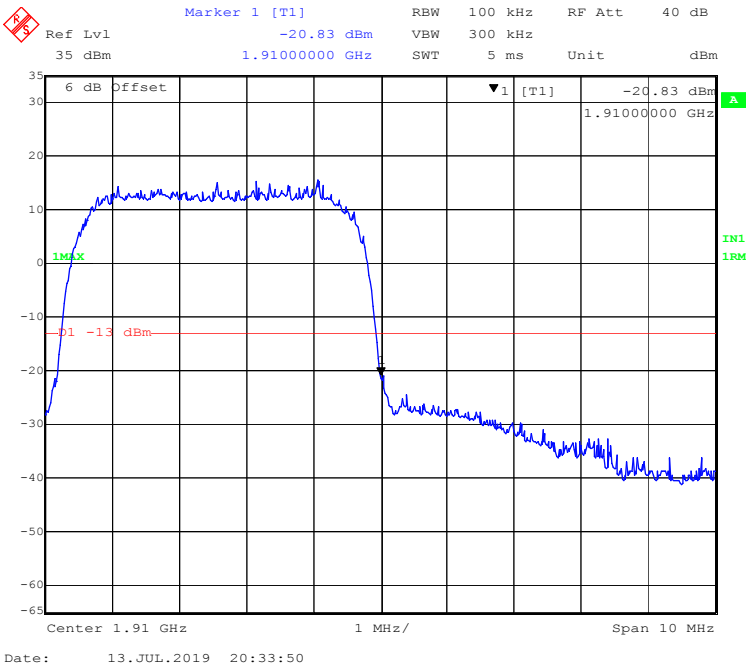
HSUPA Mode, Right Band Edge



HSPA+ Mode, Left Band Edge



HSPA+ Mode, Right Band Edge



FCC § 2.1055; § 22.355; § 24.235 - FREQUENCY STABILITY

Applicable Standards

FCC § 2.1055, §22.355, § 24.235

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

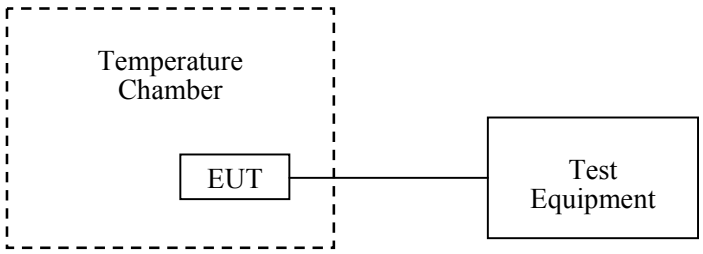
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data

Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	50%
ATM Pressure:	101.2kPa

The testing was performed by Stone Zhang on 2019-07-13.

EUT operation mode: Transmitting

Test Result: Compliant.

GSM 850 Band

GSM Mode, Middle Channel, f_o =836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	12	0.014344	2.5
0		10	0.011953	2.5
10		8	0.009563	2.5
20		7	0.008367	2.5
30		4	0.004781	2.5
40		10	0.011953	2.5
50		8	0.009563	2.5
55		6	0.007172	2.5
25	V min.= 3.6	10	0.011953	2.5
25	V max.= 4.2	16	0.019125	2.5

GPRS Mode, Middle Channel, f_o =836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	16	0.019125	2.5
0		9	0.010758	2.5
10		10	0.011953	2.5
20		4	0.004781	2.5
30		12	0.014344	2.5
40		6	0.007172	2.5
50		9	0.010758	2.5
55		8	0.009563	2.5
25	V min.= 3.6	8	0.009563	2.5
25	V max.= 4.2	4	0.004781	2.5

WCDMA Band V:

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-10	3.7	16	0.019125	2.5
0		12	0.014344	2.5
10		8	0.009563	2.5
20		0	0.000000	2.5
30		2	0.002391	2.5
40		6	0.007172	2.5
50		9	0.010758	2.5
55		8	0.009563	2.5
25	V min.= 3.6	6	0.007172	2.5
25	V max.= 4.2	8	0.009563	2.5

PCS 1900 Band:

GSM Mode, Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-10	3.7	26	0.013830	pass
0		45	0.023936	pass
10		35	0.018617	pass
20		24	0.012766	pass
30		32	0.017021	pass
40		16	0.008511	pass
50		24	0.012766	pass
55		36	0.019149	pass
25	V min.= 3.6	28	0.014894	pass
25	V max.= 4.2	20	0.010638	pass

GPRS Mode, Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-10	3.7	28	0.014894	pass
0		22	0.011702	pass
10		15	0.007979	pass
20		10	0.005319	pass
30		18	0.009574	pass
40		20	0.010638	pass
50		16	0.008511	pass
55		15	0.007979	pass
25	V min.= 3.6	21	0.011170	pass
25	V max.= 4.2	16	0.008511	pass

WCDMA Band II:

WCDMA Mode, Middle Channel, f_o=1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-10	3.7	26	0.013830	pass
0		18	0.009574	pass
10		12	0.006383	pass
20		3	0.001596	pass
30		10	0.005319	pass
40		16	0.008511	pass
50		21	0.011170	pass
55		12	0.006383	pass
25	V min.= 3.6	8	0.004255	pass
25	V max.= 4.2	16	0.008511	pass

******* END OF REPORT *******